

## CLAIMS

What is claimed is:

- 1           1.     A method comprising:  
2                 broadcasting a first frame on a physical subnet the frame containing  
3     a predetermined port number;  
4                 checking a response for a current address of a responding device;  
5     and  
6                 forcing the responding device to change to a new protocol address if  
7     the current protocol address is not within a access range of a management device
- 1           2.     The method of claim 1 further comprising:  
2                 identifying an unused address to be used as the new protocol  
3     address.
- 1           3.     The method of claim 2 wherein identifying comprises:  
2                 iteratively querying addresses within the access range until no  
3     response is received to a query.
- 1           4.     The method of claim 1 wherein broadcasting a first frame  
2     comprises:  
3                 setting a hardware address in the frame to all addresses;  
4                 setting an internet protocol (IP) address in the frame to all addresses;  
5     and  
6                 setting a user datagram protocol (UDP) port number in the frame to  
7     the predetermined port.
- 1           5.     The method of claim 1 wherein forcing comprises:  
2                 broadcasting a second frame on the physical subnet directed to the  
3     predetermined port number, the frame including a hardware address of the  
4     responding device and the new protocol address.

1           6.     A method comprising:  
2                 receiving at a device a forcing frame directed to a predetermined  
3 port and including a hardware address of the device;  
4                 changing a current protocol address of the device to a new protocol  
5 address specified in the frame, wherein the current protocol address is outside an  
6 address range of a management device and the new protocol address is within  
7 the address range of the management device; and  
8                 connecting to the management device using the new protocol  
9 address.

1           7.     The method of claim 6 further comprising:  
2                 enabling receipt of the frame directed to the predetermined port  
3 only on a local port of the device; and  
4                 disabling receipt on the local port a fixed time after power up.

1           8.     The method of claim 6 comprising:  
2                 receiving a first broadcast frame over a network from the  
3 management device;  
4                 identifying if the first broadcast frame is directed to the  
5 predetermined port; and  
6                 sending a response frame to a source of the first broadcast frame if  
7 the first broadcast frame was directed to the predetermined port, the response  
8 frame including a current protocol address.

1           9.     The method of claim 6 wherein the forcing frame is a broadcast  
2 frame specifying all hardware addresses and all protocol addresses.

1           10.    The method of claim 8 wherein receiving a first broadcast packet  
2 comprises:  
3                 snooping a hardware layer of a protocol stack for a frame directed to  
4 the predetermined port; and

5 forwarding the frame past a protocol layer independent of a protocol  
6 address if directed to the predetermined port.

1 11. The method of claim 8 wherein receiving a first broadcast frame  
2 comprises:

3 passing the frame through a hardware layer and a protocol layer of a  
4 protocol stack based on a selection of all addresses in a hardware address field and  
5 a protocol address field of the first broadcast frame.

1 12. A system comprising:

2 a network element including a direct access module; and

3 a management node residing on a same physical subnet as the

4 network element, the management node to force the network element to have  
5 an address within an access range of the management node by broadcasting to the  
6 direct access module without reconfiguring the management node.

1 13. The system of claim 12 wherein the management node and the  
2 network element are coupled together by an Ethernet connection.

1 14. The system of claim 12 wherein the network element further  
2 includes a packet filter to snoop packets arriving at a hardware layer of a protocol  
3 stack.

1 15. The system of claim 12 wherein the network element comprises:  
2 an external port; and  
3 an internal port, wherein the direct access module is only enabled  
4 on the internal port.

1 16. The system of claim 15 wherein the direct access module is disabled  
2 a predetermined time after power up.

1 17. The system of claim 12 wherein the direct access module receives  
2 frames directed to a predefined port independent of a protocol address.

1           18.    The system of claim 12 wherein the management node can use  
2 higher level protocols to manage the network element immediately after forcing  
3 the address.

1           19.    A computer readable storage media containing executable computer  
2 program instructions which when executed cause a digital processing system to  
3 perform a method comprising:

4                   broadcasting a first frame on a physical subnet the frame containing  
5 a predetermined port number;

6                   checking a response for a current address of a responding device;

7 and

8                   forcing the responding device to change to a new protocol address if  
9 the current protocol address is not within a access range of a management device.

1           20.    The computer readable storage media of claim 19 which when  
2 executed cause a digital processing system to perform a method further  
3 comprising:

4                   identifying an unused address to be used as the new protocol  
5 address.

1           21.    The computer readable storage media of claim 20 which when  
2 executed cause a digital processing system to perform a method further  
3 comprising:

4                   iteratively querying addresses within the access range until no  
5 response is received to a query.

1           22.    The computer readable storage media of claim 19 which when  
2 executed cause a digital processing system to perform a method further  
3 comprising:

4                   setting a hardware address in the frame to all addresses;

5                   setting an internet protocol (IP) address in the frame to all addresses;  
6   and  
7                   setting a user datagram protocol (UDP) port number in the frame to  
8   the predetermined port.

1           23.   The computer readable storage media of claim 19 which when  
2   executed cause a digital processing system to perform a method further  
3   comprising:

4                   broadcasting a second frame on the physical subnet directed to the  
5   predetermined port number, the frame including a hardware address of the  
6   responding device and the new protocol address.

1           24.   A computer readable storage media containing executable computer  
2   program instructions which when executed cause a digital processing system to  
3   perform a method comprising:

4                   receiving at a device a forcing frame directed to a predetermined  
5   port and including a hardware address of the device;

6                   changing a current protocol address of the device to a new protocol  
7   address specified in the frame, wherein the current protocol address is outside an  
8   address range of a management device and the new protocol address is within  
9   the address range of the management device; and

10                  connecting to the management device using the new protocol  
11   address.

1           25.   The computer readable storage media of claim 24 which when  
2   executed cause a digital processing system to perform a method further  
3   comprising:

4                   enabling receipt of the frame directed to the predetermined port  
5   only on a local port of the device; and

6                   disabling receipt on the local port a fixed time after power up.

1           26.    The computer readable storage media of claim 24 which when  
2   executed cause a digital processing system to perform a method further  
3   comprising:  
4                receiving a first broadcast frame over a network from the  
5   management device;  
6                identifying if the first broadcast frame is directed to the  
7   predetermined port; and  
8                sending a response frame to a source of the first broadcast frame if  
9   the first broadcast frame was directed to the predetermined port, the response  
10   frame including a current protocol address.

1           27.    The computer readable storage media of claim 24 which when  
2   executed cause a digital processing system to perform a method further  
3   comprising:  
4                the forcing frame is a broadcast frame specifying all hardware  
5   addresses and all protocol addresses.

1           28.    The computer readable storage media of claim 26 which when  
2   executed cause a digital processing system to perform a method further  
3   comprising:  
4                snooping a hardware layer of a protocol stack for a frame directed to  
5   the predetermined port; and  
6                forwarding the frame past a protocol layer independent of a protocol  
7   address if directed to the predetermined port.

1           29.    The computer readable storage media of claim 26 which when  
2   executed cause a digital processing system to perform a method further  
3   comprising:  
4                passing the frame through a hardware layer and a protocol layer of a  
5   protocol stack based on a selection of all addresses in a hardware address field and  
6   a protocol address field of the first broadcast frame.